OCLI

OPTICAL COATING LABORATORY, INC.
OCLI
2789 GIFFEN AVENUE · LIBERTY 5-6440 · SANTA ROSA, CALIFORNIA

THE NATURE OF OUR COMPANY

The primary business of the Optical Coating Laboratory, Inc. is the application of thin film coating by high vacuum deposition techniques. These coatings are used for optical, infrared or electrical purposes. We believe we have achieved a unique position in this field. Our objective is to fill the gap between the research laboratory and the routine production shop. To accomplish this we have made coatings our primary operation rather than a side line to some other endeavor. Out of the 35 people in our organization, a large percentage have formal training in physics, chemistry, electronics and other applicable fields. We have amassed a wealth of experience in converting laboratory proven ideas into commercially usable coatings. Our design, production and testing facilities are extensive and of high quality.

HOW WE SERVE OUR CUSTOMERS

Because we specialize in sophisticated coatings, we draw customers from all areas of the country. Transportation costs are generally a minor consideration in our type of work. Furthermore, a large percentage of our work is for customers who themselves have coating equipment. These customers often find that it is economically more feasible to have us do their job than to invest in further development of their own facilities to the required level.

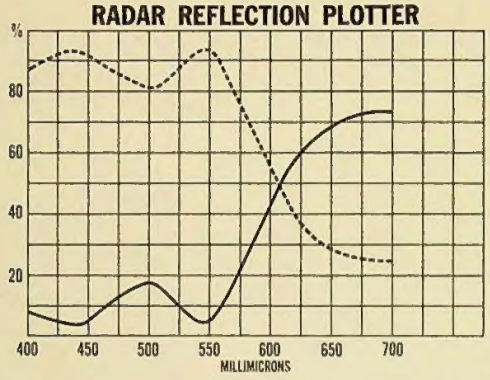
In spite of our past accomplishments, we have much to learn. There obviously is a limit to the number of problems on which we can conscientiously work at one time. Therefore, we must arbitrarily refrain from Research and Development projects which we do not feel could ultimately lead to a production item. Further, we try to confine our energies to work which we think has a good probability of success.

These spectral curves are representative of some of the coatings produced at OCLI. It should be understood that the characteristics of these coatings are not rigidly fixed ás would be the case with absorbing media. Rather they are the result of interference phenomena. Therefore, number, thicknesses and refractive indices of the layers determine location with regard to wavelength and shape of the curve. Consequently manufacturing tolerances are required. Furthermore it must be noted that these characteristics change with varying angles of incidence.

As far as possible, all of our coatings are made sufficiently durable to withstand cleaning. In many cases they also will withstand rigid environmental testing.

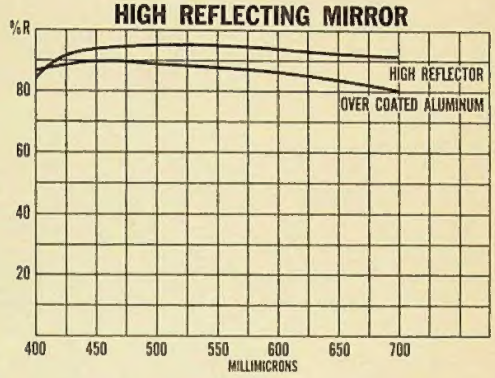
Particularly in the case of Infra Red filters, the selection of the substrate must be considered. Factors in the end use may dictate applying the coating on any one of the following substrates: cover glass, quartz, Vycor, synthetic sapphire, calcium aluminate, fluorite, silicon or germanium.

RADAR REFLECTION PLOTTER



In some radar plotter installations a partial mirror is used to eliminate parallax error. The coating shown here reflects the red of the marking pencil and transmits the blue green of the radar screen. Curves shown are for normal angle of incidence. The solid line represents reflection and the dotted line transmission.

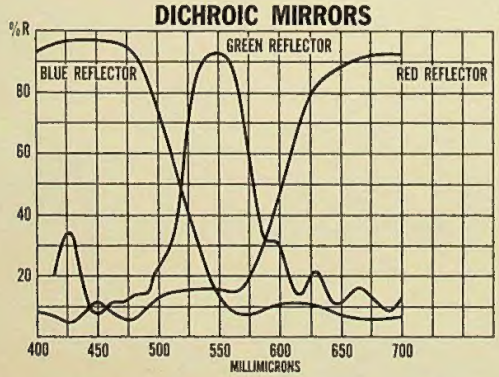
HIGH REFLECTING MIRROR



In some cases, particularly where multiple reflections are concerned, it is important to have higher efficiency than that achieved with a normally overcoated aluminum mirror. These high reflectors have the additional advantage of being unusually durable.

Curves shown are for reflection at 45° angle of incidence.

DICHROIC MIRRORS

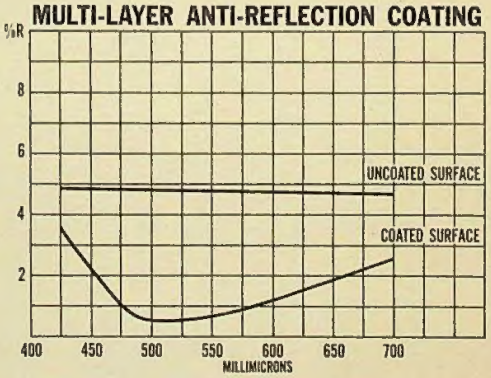


By using combinations of these and similar dichroics, color separation and color combining may be accomplished with low light loss.

These coatings also are used in gunsight reflector plates.

Curves shown are for reflection values at 45° angle of incidence.

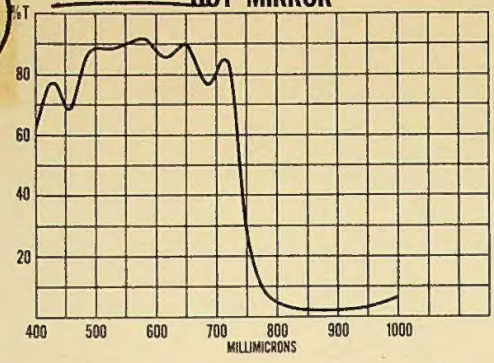
MULTI-LAYER ANTI-REFLECTION COATING



Sometimes it is desirable to reduce ghost images to a greater extent than is possible with ordinary anti-reflection films. This is particularly the case with the back surfaces of reflector plates and critical optical systems.

The curves shown are for reflection values at 45° angle of incidence.

HOT MIRROR

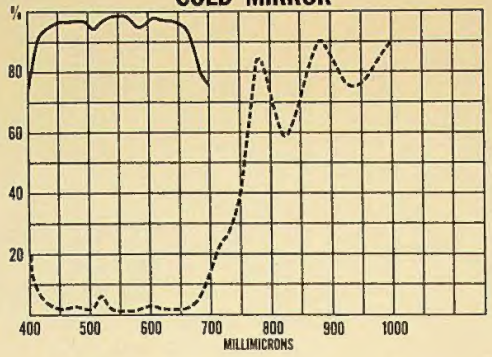


It is often desirable to separate visible light from near infrared heat. This can be done by using a "hot" mirror, a "cold" mirror or both mirrors in series.

The hot mirror reflects the near infrared but appears as a window to visible light.

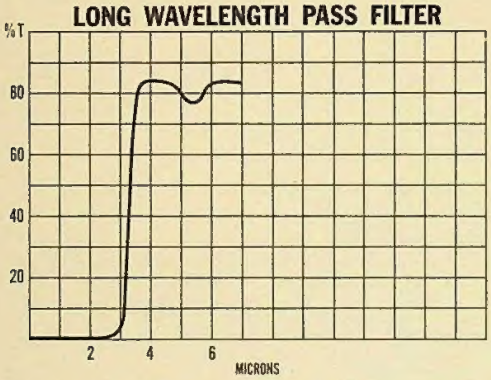
The curve shown is for transmission at normal angle of incidence.

COLD MIRROR



The cold mirror reflects the visible portion of the spectrum but it is transparent to infrared radiation. The curves shown are for normal angles of incidence. The solid line is reflection and the dotted line transmission.

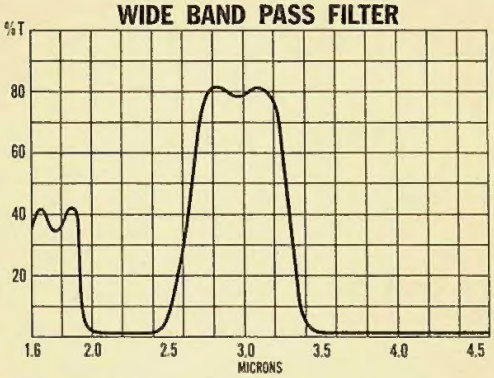
LONG WAVELENGTH PASS FILTER



Long wavelength pass infrared filters attenuate energy shorter than a given wavelength and pass energy longer than this wavelength. At present, the cutoff can be arbitrarily made to fall between 1.5 microns and 5 microns or higher. Quite high degrees of attenuation are possible without greatly sacrificing transmission. The curve shown is for transmission at normal angle of incidence.

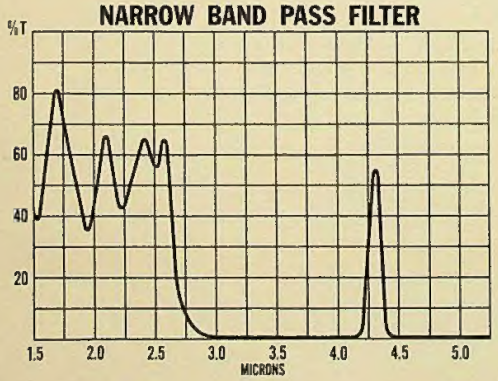
The substrate is germanium with an anti-reflection coating on the back surface.

WIDE BAND PASS FILTER



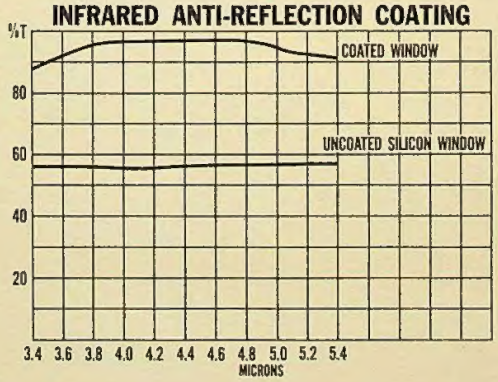
Band pass infrared filters attenuate energy on the longer wavelength as well as shorter wavelength sides of a given pass band. They are often used in series with a long wavelength pass filter that attenuates the spurious pass bands at shorter wavelengths. The curve shown is for transmission at normal angle of incidence on a substrate of quartz.

NARROW BAND PASS FILTER



Narrow band pass filters differ from wide band pass filters only in the width of the pass band. The width of the pass band measured at one half of the transmission peak can be expressed as a percentage of the wavelength at the center of the pass band. Filters can be made with pass band widths as great as 30% or as narrow as a fraction of 1%. The transmission curve shown is for a 4% band width filter at normal angle of incidence with substrate losses subtracted.

INFRARED ANTI-REFLECTION COATING



Due to their high index of refraction several of the important infrared optical materials have high reflection and poor transmission. Therefore good anti-reflection coatings become extremely important.

The curves shown are for transmission at normal angles of incidence through a total of 2 surfaces.

PRODUCTS OF THE OPTICAL COATING LABORATORY, INC.

VISIBLE SPECTRUM

Gunsight Reflectors
"Hot" Mirrors
"Cold" Mirrors
Neutral Non-Absorbing Beam Splitters
Corrosion Resistant Mirrors
High Reflecting Mirrors
Mirrors to 60" Diameter
Galvanometer Mirrors
Shadowed Reticles
Neutral Density Filters
Transparent Mirrors
Color Separation Films
2 Color Radar Plotters
Neutral Radar Plotters
Anti-Reflection Coatings

INFRARED SPECTRUM

Wide Band Pass Filters
Long Wavelength Pass Filters
Narrow Band Pass Filters
Anti-Reflection Coatings
2 Wavelength Segmented Filters

ELECTRICAL FILMS

Anti-Static Films
Transparent Conducting Films
Resistance Films
Insulating Films
Evaporated Thermocouples

MISCELLANEOUS

Infrared Heat Shielding on Fibreglass
Special Material Evaporations

RESEARCH & DEVELOPMENT

For us R & D means new coating designs and new application techniques. We are constantly working in both these directions. We use electronic computers in calculating more complex multi-layer film requirements and we use our hard-earned experience, our formal training and our production know-how in translating calculations into production. Therefore, if the item that interests you is not listed in this folder, tell us your problem anyway. It may be something on which we are currently working.

QUOTATIONS

Prices are generally handled on a special quotation basis. To save time when writing us about a job, give more than the obvious data such as number of parts required, size, etc. Give us any pertinent physical or functional requirements of the part . . . the angle of incidence of the light path . . . wavelengths involved and the tolerances on wavelengths . . . percentages of reflection or transmission . . . any applicable military specifications . . . requirements for resistance to abrasion or corrosion . . . area allowed for holding jig mark . . . in short, any information that will save a later cross-fire of questions and answers between us.

OPTICS

When the cost of the optics to be coated is incidental to the coating job, we will undertake to purchase the uncoated optics from reliable vendors and will supply finished parts to our customers. Our organization does not include facilities for the grinding and polishing of optics.

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